

Images of Eternity in 3D. The visualization of ancient Egyptian coffins through photogrammetry.

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Project description and objectives

By using the technique of photogrammetry for the 3D visualization of ancient Egyptian coffins decorated with magical texts and iconography, this project aims at building up a new digital platform for an in-depth study of the ancient Egyptian funerary culture and its media. It has started in August 2015 through the support of a Mellon Fellowship for the Digital Humanities at UC Berkeley and up until now it has focused on ancient Egyptian coffins kept at the Phoebe A. Hearst Museum of Anthropology of UC Berkeley. The main outcome will be a digital platform that allows to display a coffin in 3D and where users will be able to pan, rotate, and zoom in on the coffin, clicking on areas of text to highlight them and view an annotated translation together with other metadata (transcription of the hieroglyphic text, bibliography, textual variants, museological data, provenance, etc.)

In the ancient Egyptian language, coffins and sarcophagi used to preserve the mummy were literally called “chests of life” in order to express the desire of (re-)birth and life after death in the netherworld, where the deceased would assimilate to the gods. These coffins belonged to female and male individuals who were part of the elite of the society; they were expensive funerary items, which skilled scribes and artists decorated (inside and outside) with texts and images concerning the journey of the deceased in the netherworld and the gods and other supernatural creatures populating those regions. Wooden and stone mummy cases are central items of the Egyptian collections around the world and they were in use already since the Second Millennium BCE throughout the Greco-Roman Period. At present, there is a renewed international interest in the study of ancient Egyptian coffins, with conferences and research projects studying particular coffin and burial-assemblages from prominent religious cult centers in Egypt such as Thebes (see the Lisbon-based project on Bab el-Gasus: <http://babgasusconference.weebly.com/>) or focusing on the coffin painting techniques and workshop production (see the Vatican Museum-centered “Vatican Coffin Project”: http://www.museivaticani.va/3_EN/pages/z-Info/Convegna/MV_Info_19-23giugno2013.html).

However, there has been no comprehensive attempt, until now, to investigate the very complex function of the coffin decoration as an important media of the ancient Egyptian funerary culture and to understand how textual and iconographical patterns developed and are distributed on the interior and exterior surface of each coffin, which is in itself a fully independent, small-scaled architectural and conceptual entity, closely connected to the larger context of the tomb and of its decoration and funerary equipment. Through the study of the coffins decoration, one can gain new insights on the rituals which took place before burial, understand the materiality of the texts mapped on the object and explore new approaches of study of the ancient Egyptian religion and ideas on death and the afterlife.

It is especially by looking and visualizing an object in its tridimensionality that one can better understand how its textual and iconographical decoration is fully embodied on its media (the coffin itself); a 3D visualization of the inscriptions, in particular, allows us to read them without losing the sense of the specific section of the lid where it has been inscribed, at the same time allowing us to put special emphasis on the visualization of the text in a physical context, working on the relationship of the inscriptions to their support, the form and varieties of hieroglyphs and words and how they are closely related to the images embedded among the texts and complementing them.

Methodology

Within the vast range of digital technologies currently on the market for the realization of 3D models, photogrammetry (or “Structure from Motion”) is among the most effective when working on small-scale objects such as coffins and other magical artifacts from ancient Egypt. For this project, the software Agisoft Photoscan is being employed: beside generating 3D models, point clouds and DSMs from digital photos, this software is also useful to collect spatial data and to visualize the texture of the objects in HDR quality for very detailed presentations of the models on web publications. It will therefore be useful for detecting specific forms of hieroglyphs for the final text interpretation. At present, two objects have been already fully photographed and rendered in 3D: one stone sarcophagus lid dated to the second half of the First Millennium BCE (Hearst Catalogue Nr. 5-522) and one painted wooden coffin of the end of the First

Millennium BCE (Hearst Catalogue Nr. 6-19927, see Figs.1-2). These two 3D models need now to be “annotated” through the study of the metadata, namely the hieroglyphic transcription and translation, the iconographical analysis and the comparative analysis with other specimen/texts produced within the same historical and religious context.

Two more wooden coffins dated to the First Millennium BCE have been selected for photo shooting in order to produce their 3D model at the Hearst Museum and one other fully inscribed wooden coffin kept at the Legion of Honor in San Francisco (the so-called “Wilsey” coffin, dated to 380-343 BCE: <https://art.famsf.org/anthropoid-coffin-iret-hor-irou-20022a-b>.) These are all still unpublished although presenting rare sets of hieroglyphic texts and religious illustrations, which would deserve an in-depth study and edition. The final aim is to extend this kind of analysis to any other fully decorated coffin, which could be selected by the team members or by interested scholars for its 3D visualization and study, so that a tridimensional database of coffins would be progressively built.

External cooperation, impact and sustainability

The digital platform that will host the 3D models is being realized in cooperation with the “Immersive Humanities” working group based at the Digital Institute of UCLA and directed by Willeke Wendrich, Professor of Egyptology. The Immersive Humanities project aims at producing tridimensional models of artifacts and at enabling rich text/visual descriptions tagged with complex data (<http://www.cdih.ucla.edu/projects/immersive-humanities-viewer/>). The 3D models of the coffins at the Hearst Museum and at the Legion of Honor will be therefore employed as one of the case studies for the UCLA-based project as well. By linking the project to the work of the Center for Digital Humanities, its sustainability will be granted and the Center will help with the resources needed for future updates, adding new contents and the hosting and maintenance costs of the platform.

Moreover, the Archaeological Research Facilities (ARF) of the University of California, Berkeley, in particular through Nicholas Tripcevich, is contributing to the technical needs of the projects by providing computer facilities and students to work with the Photoscan software.

This project will open new perspectives for the study of the ancient Egyptian magical texts and iconography, since it will develop a new research tool offering the possibility to use 3D-Models on an internet platform for the documentation and analysis of both the ancient Egyptian texts and images and the material objects on which they appear. In the future, such a platform may also be used as a teaching tool for undergraduate courses and graduate seminars on ancient Egyptian funerary literature, language and religion, where students would learn to map texts and images on the object and to understand the relationship between written and material culture, text and its writing support.



Figs. 1-2. Screenshot of the 3D model of the coffin of Iwesenmin and of its mummy (Hearst 6-19927)

